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Mathematics 309a: Abstract Algebra
Winter Semester 2009
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Quiz #2
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Define the operation $*$ on \mathbb{R} (the real numbers) by $a * b = \frac{a+b}{2}$, where the $+$ is the usual addition for real numbers.

A. Compute $5 * 3$ and $3 * 6$.

B. Prove that $*$ is not associative on \mathbb{R} by giving three specific real numbers a, b, c and showing $(a * b) * c \neq a * (b * c)$.

C. Show that $*$ is commutative on \mathbb{R} .

D. \mathbb{Z} (the set of all integers) is a subset of \mathbb{R} . Show that \mathbb{Z} is not closed under $*$ by giving numbers a and b in \mathbb{Z} for which $a * b \notin \mathbb{Z}$.